Space Weather Forecast

Issued on Thursday, 18 April 2024 at 01:25 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Further Moderate-flares likely and a slight chance of Strong-flares. Chance of G1/Minor Storm conditions day 1 and 3 (18 and 20 Apr).

Solar Activity: Activity is currently Moderate. The largest flare was a Moderate flare at 16/1802 UTC from a small region amongst a cluster of sunspot groups in the southeast disc.

There are fourteen sunspot regions currently visible on the disc. The largest and most magnetically complex region lies in the northeast and provides the bulk of the significant flare risk. The next largest region, located in the northwest, although sizeable, maintains a more magnetically simple appearance. The complex multi spot region in the southeast contains several groups with enhanced magnetic complexity. Remaining regions appear generally more stable with only slow evolution. The remaining regions appear generally stable with little overall change in appearance.

A filament eruption (arc of the Sun's plasma) was observed around 17/0200 UTC lifting off in the northern hemisphere, although unlikely to have any Earth-directed component as the bulk of material appears to be heading north away from the Earth-Sun line. Three separate, but slow CMEs were observed from an area near a sunspot in the southeast late on 17 Apr. These may have a minor Earth-directed component, but have been analysed to be slow and would only expected to be observed as weak transients on 22 or 23 Apr.

Solar Wind / Geomagnetic Activity: Solar wind parameters were indicative of minor CME influence during the period. Solar winds were largely background, but with a peak of 481km/s (slightly elevated) observed at 17/0938 UTC. The Interplanetary magnetic field (IMF) strength was weak initially, but became predominantly moderate following the arrival of the CME around 17/0900 UTC. The important north-south component was weakly northwards directed at first, becoming generally weakly to moderately southwards directed between 17/0900-1800 UTC, then largely weakly northward directed thereafter. Resultant geomagnetic activity ranged from Kp1 (Quiet) to Kp3 (Unsettled).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background with no Solar Radiation Storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is forecast with isolated Moderate-class flares likely and a slight chance of isolated Strong flares.

Solar Wind / Geomagnetic Activity: A CME that left the Sun on 15 Apr is expected to give a glancing impact at Earth early on day 1 (18 Apr). A second CME that occurred late on 16 Apr has been analysed as a likely miss below Earth orbit on day 3 (21 Apr).

Solar winds are currently at normal background speeds. A minor enhancement is expected with the anticipated arrival of the CME from 15 Apr, early on day 1 (18 Apr). A recurrent coronal hole high-speed stream is expected to become geoeffective on day 3 (20 Apr) likely increasing speeds to slightly elevated or elevated levels, continuing into day 4 (21 Apr).

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Geomagnetic activity is expected to be at Quiet to G1/Minor Storm levels on day 1 (18 Apr), then Quiet to Unsettled on days 2 and 3 (19 and 20 Apr), likely increasing Unsettled to G1/Minor Storm levels during day 3 (19 Apr). On day 4 (21 Apr) activity is forecast at Quiet to Unsettled levels.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to remain at background with no Solar Radiation storms occurring.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	30	5	20	5
Strong	G3	No	5	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	70	70	70	70
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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